STATE OF CALIFORNIA -- THE RESOURCES AGENCY
ARNOLD SCHWARZENEGGER, *Governor*

DEPARTMENT OF WATER RESOURCES
DIVISION OF ENVIRONMENTAL SERVICES
3251 S STREET
SACRAMENTO, CA 95816-7017

December 1, 2004

Dr. Jim Cloern
U.S. Geological Survey
345 Middlefield Rd. MS-496
Menlo Park, CA 94025

Dear Jim,

I am writing this letter to acknowledge that I am willing to serve as an advisor to your project, "Native and Alien Fish Population Trends". Given the strength of your team and the comprehensive nature of the study, I believe that it would be very worthwhile for DWR to participate in an advisory capacity.

As you are aware, uncertainties about the responses of the Estuary to climate change remain one of the greatest issues facing CALFED's efforts to restore and manage aquatic resources. While previous efforts by your colleagues (Dettinger, Knowles, Cayan) have provided insight into the general effect of climate change on Northern California, this information has not, as yet, been effectively linked to invasive species and native fishes. In particular, CALFED's restoration projects could be undermined if climate change adversely affects habitat and outflow patterns. I am hopeful that your study would provide fisheries managers with the first analysis of how climate change could affect populations of some of the target native fishes, as well as alien species that compete with them.

Good luck with your proposal.

Sincerely,

Dr. Ted Sommer
Senior Environmental Scientist

Cc: Dr. Larry Brown, USGS

United States Department of Agriculture
Forest Service
Pacific Southwest Research Station
P.O. Box 245
Berkeley, CA 94701-0245
(510) 559-6300
FAX (510) 559-6440
TDD (510) 559-6307

5 May 2003

Dr. Michael Dettinger
U.S. Geological Survey
Scripps Institution of Oceanography
La Jolla, California 92093-0224

Dear Mike;

As you know, the Sierra Nevada Research Center, within the Pacific Southwest Research Station, has proposed a collaborative, interdisciplinary effort to assess climate change and its consequences in the Sierra Nevada ecoregion. Presently in development stage, the *Sierra Nevada Climate Change Assessment Project* (SNCCAP) has as its central objective to integrate regionally relevant projections of 21st-century climate change into resource and rural planning in the Sierra Nevada. We anticipate three phases to this multi-year assessment:

Phase 1: Assess climate change at river basin to subregional scales;

Phase 2: Assess consequences of climate change to physical systems, ecosystems, and rural communities and economies from subregions to Sierrawide;

Phase 3: Integrate assessments into existing and new resource and county/local planning and policy-making through development of case studies, models, and illustrative guidelines.

Critical to the success of this project are the soundness and variety of climate change scenarios that will be developed. We anticipate soliciting projections that employ diverse methods and bracket reasonable assumptions of future climate derived from sources as different as GCM and paleoclimatology.

Because expertise within the Pacific Southwest Research Station exists primarily for the analyses described as Phases 2 and 3, we will depend on other colleagues to develop climate change scenarios. The short proposal you recently sent, "Climate-Change Scenarios: A Component of the USGS Place-Based Bay-Delta Scenario Evaluation Project" contains many of the elements we will hope to obtain for SNCCAP. Especially important in your proposal are the downscaling approaches, using statistical approaches trained by historical

weather series, and reflecting projected 21st century fluctuations. The three detailed scenarios proposed would be valuable to SNCCAP, namely two scenarios that bracket

projections within the range of expected fluctuations based on station data, and one that employs fluctuations derived from paleo-climate assumptions of extended droughts and other climate "surprises". Of particular importance to SNCCAP would be the choice of 200 stations to which you anticipate downsizing. Because our concerns are to montane regions west and east of the Sierra crest, we would be interested specifically in projections to mountain weather stations and locations within the Sierra Nevada.

At present, no funding is available to support SNCCAP at the level we are proposing. However, we are actively pursuing several encouraging tracks for federal and external support to develop a robust interagency, interinstitutional project. We look forward to collaborations with you and your research team.

Sincerely,

/Connie Millar/

CONSTANCE I. MILLAR
Research Geneticist
Sierra Nevada Research Center
800 Buchanan St., Albany, CA 94710
Research Geneticist
ph: 510-559-6435
email: cmillar@fs.fed.us

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AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION

DEPARTMENT OF WILDLIFE, FISH, AND CONSERVATION BIOLOGY
ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616-8751
FAX (530) 752-4154

6-2-03

James E. Cloern, Senior Research Biologist
U.S. Geological Survey MS496
345 Middlefield Rd.
Menlo Park, CA 94025

Dear Dr. Cloern:

I would be pleased to serve as an adviser, regarding resident and migratory fishes, on the USGS grant proposal that Dr. Larry Brown is preparing on global climate change scenarios in the Sacramento – San Joaquin Delta ecosystem. My research interests include the physiological adjustments and adaptations of fishes to their environments, and my students and I have conducted studies on Delta fishes for 20 years.

Sincerely,

Joseph J. Cech, Jr.
Professor, and
Director, UC Davis Center for Aquatic Biology and Aquaculture

cc: Dr. Larry Brown

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DEPARTMENT OF ENVIRONMENTAL SCIENCE AND POLICY

ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616-8576

May 31, 2003

Dr. James E. Cloern
U.S. Geological Survey
345 Middlefield Road, MS #496
Menlo Park, CA 94025

Dear Jim:

I read with great interest your draft proposal on "Responses of the San Francisco Bay-Delta-Watershed to scenarios of changing climate, land use, and water storage-conveyance." The proposed research gets to the heart of some of the most critical resource issues facing California. The comprehensiveness of the program's goals and the array of scientific and technical expertise assembled for the task assure beneficial consequences for managing these issues in California and for providing basic understanding of these same problems elsewhere.

As you may know, some of us here at UC Davis are currently doing related research on the lower trophic levels of the Delta and Suisun Bay. In particular, we are examining the historical data sets of water quality, phytoplankton, and zooplankton in order to characterize long-term behavior, understand the dominant mechanisms of variability, and to explore a variety of data-based models—both traditional statistical approaches as well as newer, biologically-inspired computational methods—for examining responses to scenarios of climatic, hydrographic, and loading changes. The response of the plankton is important because of its role as a dominant energy and/or nutrient source for fish and fowl, as well as its direct influence on drinking water quality, hypoxia, and transport and bioaccumulation of contaminants. As the current long-term increase in transparency (and temperature) of the Delta continues, the frequency of major algal blooms will likely increase as well.

The larger scope of your project certainly includes many of these plankton-related issues, although using different tools. There is therefore a great opportunity here for collaboration and I am anxious to help in whatever way possible. I also believe our project will benefit specifically by using the detailed climate and hydrology scenarios provided by your proposed research. I welcome your invitation to serve as a project advisor and consultant, participate in principal investigator meetings, and join in other activities integral to these efforts.

Best regards,

Alan Jassby
Research Ecologist

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

June 16, 2003

Dr. James Cloern
Water Resources Division
Western Region Research office
United States Geological Survey
Menlo Park, CA 94025

Dear Dr. Cloern:

The Environmental Protection Agency (EPA) has often voiced, among the CalFed agencies, a concern about the threat of global climate change on the aquatic resources of California. EPA believes that long-term water resource planning, levee maintenance, ecosystem restoration and water quality protection must include considerations of the range of likely changes in rainfall patterns and sea-level rise. At the same time, EPA has championed a watershed and landscape level approach within the CalFed planning process. EPA is, therefore, very supportive of the type of work you outline in the research proposal "Responses of the San Francisco Bay_Delta-Watershed to Scenarios of Changing Climate, Land Use, and Water Storage-Conveyance."

EPA is also happy to provide the occasional services of Dr. Bruce Herbold of our staff for the technical review team that is proposed to oversee the biological portions of the project.

Please contact Bruce Herbold (415 972 3460) for any further help we can provide toward moving this kind of research forward.

Sincerely,

Karen Schwinn
Assistant Director
Water Division
EPA Region 9

San Francisco Estuary Institute

7770 Pardee Lane
2nd Floor
Oakland, CA 94621
Office (510) 746-SFEI
Fax (510) 746-7300

June 3, 2003

Dr. James Cloern
U.S. Geological Survey MS 496
345 Middlefield Rd.
Menlo Park, CA 94025

Dear Dr. Cloern:

I am pleased to write in support of the USGS scientists scenarios proposal, headed by Dr. David H. Schoellhamer "Numerical Models to Determine Responses of the San Francisco Bay –Delta Watershed to Scenarios of Changing Climate, Land Use, and Water Storage-Conveyance". The proposal includes a component to model sediment, geomorphology, and habitat evolution in the Bay and Delta which is relevant to wetland restoration planning and long-term contaminant fate estimation.

This project other components include climate modeling, a Central Valley watershed model, Delta modeling, river salinity monitoring, contaminant fate and effects, invasive species, and fisheries.

If the project is funded it will provide many benefits to a very wide range of users as well as to California as a whole.

Thank you for your consideration.

Sincerely,

Dr. Michael S. Connor
Executive Director
San Francisco Estuary Institute

cc: David Schoellhamer

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ENVIRONMENTAL ENGINEERING PROGRAM
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
631 DAVIS HALL # 1710
BERKELEY, CALIFORNIA 94720-1710

PHONE: (510) 642-4011
FAX: (510) 642-7483

June 11, 2003

Dr. James E. Cloern
U.S. Geological Survey
345 Middlefield Road, MS#496
Menlo Park, CA 94025

Dear Jim,

I write to add my enthusiastic support to your proposal "Responses of the San Francisco Bay-Delta-Watershed to scenarios of changing climate, land use, and water storage-conveyance." The proposal represents an ambitious undertaking to examine the long-term implications of both management decisions and climate uncertainties. I am particularly encouraged by the choice of a mechanistic modeling approach to link climate scenarios to ecosystem impacts, which will allow the numerical models to effectively depict future conditions.

As you are aware, I have two related efforts underway in my lab at UC-Berkeley. First, we are working on the development of a temperature model for shallow water habitats in the Delta. Secondly, we have undertaken a series of five field experiments in Franks Tract to examine the influence of vegetation on flows in Delta shallow water habitats, with a goal of understanding the seasonal and longer-term variations in shallow water habitat circulation and bathymetry.

The connection between these activities and the modeling activities in your proposal are clear, which provides an excellent opportunity for collaboration and I look forward to contributing in a variety of ways. To be specific, I will work with Nancy Monsen and yourself in guiding the development of a Delta-wide temperature model to address the effects of climate scenarios. More generally, I would anticipate being involved with broader discussions among the investigators and analysis and discussion of the results from several of the project elements. Of particular interest to me are the links between the various project elements, such as the two-way link between delta circulation (element #4) and geomorphology (element #5) or between the dynamics of estuarine shallow habitats and bivalves (element #7). I look forward to this collaboration and appreciate the opportunity to be involved.

Sincerely,

Mark Stacey
Assistant Professor
Environmental Engineering
UC-Berkeley

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY
REFER TO:

JUN 0 2 2003

MP-700
RES-3.10

Noah Knowles
United States Geological Survey – WRD
345 Middlefield Road, MS 496
Building 15, McKelvey Building, Room 3024
Menlo Park, CA 94025

Subject: MP-710 Technical Support to USGS Through Temperature Modeling of CALSIM II Output

Dear Dr. Knowles:

This is in response to your request for Bureau of Reclamation participation in your proposed research project "Watershed and Estuary Modeling: A Component of the USGS Place-Based Scenario Evaluation Project." We appreciate this opportunity to participate, but do caution that our workload limits our participation to a few days. We understand that you will provide CALSIM simulations and other required inputs to our existing suite of reservoir and river temperature models.

We look forward to our participation in the proposed project. If you have any questions, please contact Russ Yaworsky, at (916) 978-5099.

Sincerely,

Ronald Milligan

for Alan R. Candlish
Regional Planning Officer

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COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES
AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION
FAX: (530) 752-4154

ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616-8751

29 May 03

Dr. James E Cloern,
US Geological Survey
Bldg. 15, McKelvey
345 Middlefield Road
Menlo Park, CA 94025

Dear Jim:

This is to let you know that I will be pleased to serve on an advisory committee to Dr Larry Brown's subproject on fish ecology in the grand project called "Responses of the San Francisco Bay Delta watersed to scenarios of climate change, land use, and water storage-conveyance."

It always a pleasure to work with scientists from USGS.

Sincerely,

Peter B. Moyle
Professor

STATE OF CALIFORNIA -- THE RESOURCES AGENCY
GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

October 1, 2003

Dr. Noah Knowles
USGS-WRD
345 Middlefield Road, MS 496
Building 15, McKelvey Building, Room 3024
Menlo Park, California 94025

Dear Dr. Knowles:

This letter is in support of the collaborative research by Scripps Institute of Oceanography and the U. S. Geological Survey on climate change impacts on California's water resources, including your proposed project titled "Responses of the San Francisco Bay-Delta Watershed to Scenarios of Changing Climate, Land Use, and Water Storage Conveyance". In addition to the proposed project, joint research efforts lead by you, Dan Cayan of USGS, Mike Dettinger of the Scripps Institute and USGS, and Hugo Hidalgo of the Scripps Institute, under the California Applications Program and the California Climate Change Center provide valuable information for the assessment of potential impacts of climate change on water resources management in California.

Your current and proposed research offers potential opportunities for cooperation between Scripps-USGS, and the California Department of Water Resources. Of particular interest are a couple of items on how the work could benefit the California Department of Water Resources:

- From a water supply standpoint, your work on quantification of the timing and magnitude of snowmelt and runoff shifts due to climate change could provide valuable inputs to management tools such as DWR's CALSIM model. As indicated in the Watershed-Estuary Modeling section of your proposal, CALSIM could be used to determine potential changes in system operations under climate change scenarios.

- Your proposed work on assessing impacts of sea level rise in conjunction with changes in snowmelt and runoff could be used by DWR to investigate joint impacts of sea level rise and hydrology changes on flow, water levels, and water quality in the Delta using tools such as DWR's Delta Simulation Model 2 (DSM2).

Cooperation between Scripps-USGS and DWR could include sharing data and information. Scripps-USGS could provide DWR with downscaled precipitation, temperature, and runoff data from your climate change studies to be used as input to DWR's management tools, especially CALSIM and DSM2. DWR could offer you support in running CALSIM as part of your studies, including providing the land use and population estimates that are currently being used in DWR's CALSIM studies. Meetings between our groups once or twice a year could further enhance our cooperative efforts.

In summary, there are areas in your proposal that are of great interest to us here at DWR and could possibly assist us in future management activities. Establishing data sharing between DWR and Scripps-USGS could enhance both of our efforts.

Sincerely,

Francis Chung

Francis Chung, Ph.D., P.E.
Chief, Modeling Support Branch

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SCRIPPS INSTITUTION OF OCEANOGRAPHY LA JOLLA, CALIFORNIA 92093

June 23, 2003

Noah Knowles, Ph.D.
Researcher
United States Geological Survey
Menlo Park
California

Letter of Support: CALFED proposal: *Watershed and Estuary Modeling: A Component of the USGS Place-Based Scenario Evaluation Project*

Noah

Dear Dr. Knowles,

I am very excited by your proposal to investigate the connections between changes in climate, land-use and freshwater demand in the Sacramento and San Joaquin river basins and changes in the San Francisco Bay/Delta estuary. I am increasingly convinced that the integration of high-resolution climate models along with a better characterization of the Central Valley's hydrology and reservoir systems will significantly improve current assessments of ecological, socio-economical and environmental impacts of climate change and climate variability in California.

I will gladly collaborate with your group in this investigation. In particular, I would like to offer my collaboration in the modeling of the changes in hydrology under climate and land-use change scenarios using the CALSIM model. For the past two years, I have been modeling water quantity and water quality of the San Joaquin River (SJR) Basin using CALSIM II and DSM2 models as part of an EPA/STAR project to study climate change impacts in the streamflow and salinity of the SJR. Your proposed study is a much needed broadening of the scope of this previous work. It will provide managers and decision makers with an integrated assessment of climate change and climate variability impacts in many hydrological and environmental variables for the entire Central Valley and the San Francisco Bay/ Delta estuary.

Best wishes on the proposal!

Hugo Hidalgo, Ph.D.
Researcher